REMARKS/ARGUMENTS

Introduction

Receipt of the Office Action mailed August 6, 2002 is acknowledged. The present amendment clarifies the specification in formal regards. Claims 1, 4, 12, 14 and 15 have been amended to clarify the present invention and new claims 16 has been added. Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

Support for the instant amendments can be found throughout the specification and claims as originally filed, and support for new claim 16 can be found, for example, on page 4, lines 16+. No new matter has been added. Entry of the amendment and favorable reconsideration are earnestly solicited. Claims 1-16 are pending.

Rejection of claims 14 and 15 under 35 U.S.C. § 101

The "use-claims" 14 and 15 have been rewritten by way of the present amendment. Withdrawal of this rejection is respectfully requested.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 1 and 12 have been amended to delete the "and/or" language, thus obviating this rejection. The Examiner is respectfully requested to reconsider and withdraw the rejection based on 112.

Rejection of claims 1, 2, 4, 6, 7, 9-11 and 13-15 under 35 U.S.C. § 103(a) over Bastioli et al. .

This rejection is respectfully traversed for at least the following reasons. Although Bastioli teaches polymeric compositions comprising starch and a synthetic thermoplastic polymer (col. 1, l. 12-14), Bastioli fails to teach or suggest a polyester urethane or a thermoplastic starch or starch ingredient as instantly claimed. That is, the synthetic thermoplastic polymer of Bastioli may be, *inter alia*, a thermoplastic block or graft copolymer

between a homo- or copolymer of aliphatic hydroxycarboxylic acids and, among others, a polymer derived from the reaction of diols, or polymers having diol terminal groups with aromatic or aliphatic bifunctional isocyanates (col. 1, line 66, to col. 2, line 12). Moreover, the natural or modified starches mentioned in col. 2, lines 3-4 of Bastioli are an integral part of a block or graft polymer and thus do not form a separate ingredient of the composition. The assertion on page 4, first paragraph, of the Office Action is thus not correct.

Therefore, since Bastioli does not provide any motivation to modify the polyester part in a way as to arrive at the polyester urethanes as instantly claimed nor teach or suggest the use of a thermoplastic starch or starch derivative as a component in a thermoplastic mixture, the instant rejection is improper and should be withdrawn. Namely, the invention of claim 1 is directed to a film produced from a thermoplastic mixture comprising: a) thermoplastic starch, a thermoplastic starch derivative or both a thermoplastic starch and thermoplastic starch derivative, and b) at least one polyester urethane, with the weight ratio a):b) being in the range from 75:25 to 5:95, and which has an area-based drawing ratio of from 2 to 70. Nowhere does Bastioli teach or suggest such a mixture having two separate components a) and b) as claimed.

Applicants also wish to point out the separate patentability of new claim 16 that is directed to at least one polyester urethane comprising units selected from the group consisting of dihydric alcohols, polyhydric alcohols, dibasic carboxylic acids and polybasic carboxylic acids. Bastioli fails to teach or suggest this feature as well for at least the reasons set forth above.

For all these reasons, the instant rejection based on Bastioli is believed to be improper and should be withdrawn. The Examiner is respectfully requested to reconsider and withdraw the rejection based on Bastioli.

Rejection of claims 1-15 under 35 U.S.C. § 103(a) over Hammer et al. (US 5,928,737) in view of DD 247 830 A

This rejection is respectfully traversed. Hammer et al. '737 discloses a biaxially stretched tubular food casing comprising thermoplastic starch. The casing material may further comprise a fiber reinforcement, proteins, crosslinkers, lubricants, synthetic polymers and the like. As suitable synthetic polymers, polyamides, polyesters, polyolefins, polyvinylpyrrolidones

and ethylene/ethyl acrylate/maleic anhydride copolymers are mentioned (col. 3, lines 48-59). Polyester urethanes are not in any way contemplated as further ingredients of the food casing of Hammer '737.

The DD reference does not provide for the deficiencies of Hammer et al. '737. The sausage casing of the DD reference includes a polyurethane and *native* starch, wherein the starch acts as a filler (the native starch is dispersed in the polyurethane component). Thermoplastic starch, i.e. a starch which has lost its helix structure and is in an amorphous state, is not disclosed or contemplated by the DD reference being relied upon.

There is simply no motivation provided in either the DD reference or in the Hammer '737 reference to include a polyester urethane in Hammer '737's composition. Nor is there any motivation to use thermoplastic as opposed to native starch in the DD reference's composition. In fact, according to the DD reference, the starting materials for the polyurethane are long-chain hydroxy compounds, such as polyesters and/or polyethers having a molecular weight from 500 to 3,000, short-chain aliphatic and/or aliphatic diisocyanates. These polyurethanes of the DD reference are used to produce sausage casings by a one-shot or prepolymer process. In such a process, the starch is admixed with one of the starting materials and thereafter reacted with the remaining components at elevated temperatures (page 1, lines 16-13 from the bottom). Accordingly, the diisocyanates will necessarily react with the native starch. A polyester urethane, as employed in the present invention, could not be obtained by the process disclosed in the DD reference being relied upon by the Examiner.

For all these reasons, the proffered combination of references (Hammer '737 and DD 247 830 A) fails to teach or suggest the invention of the present claim 1. Furthermore, claim 16 is believed to be separately patentable since the combination of references fails to teach or suggest the particular urethane recited. The Examiner is therefore respectfully requested to reconsider and withdraw the outstanding rejection based on Hammer '737 and DD 247 830 A.

Conclusion

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested

to withdraw the outstanding rejection of the claims and to pass this application to issue. If the Examiner has any questions or believes an Examiner's amendment would expedite prosecution of this application, the Examiner is invited to contact the office of the undersigned attorney of record at the phone number listed below.

Dated: December 4, 2002

Respectfully submitted,

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Version With Markings to Show Changes Made

In the Specification

Page 4, paragraph 2-

The thermoplastic polyester urethane (also t4ermed "TPU" hereinafter) consists of hard polyurethane and soft polyester segments, the segments being arranged in alternating sequence. "Soft" denotes segments having a glass transition temperature (T_g) of -20°C or below, in contrast "hard" denotes those having T_g of +30°C or above. The polyester urethane can be of aliphatic or aromatic nature. The proportion of polyurethane segments in the thermoplastic polyester urethane is in this case from 10 to 90% by weight, preferably from 20 to 50% by weight, in each case based on the total weight of the polyester urethane. They generally consist of diisocyanate and diol unites. The diisocyanate unites can be aliphatic, cycloaliphatic or aromatic. Examples of aliphatic diisocyanates are butane 1,4-diisocyanate and hexane 1,6-diisocyanate. Isophorone diisocyanate (= 3-isocyanatomethyl-3,5,5-trimethylcyclohexane isocyanate) represents a cycloaliphatic diisocyanate. Toluene 2,4-diisocyante and 2,6-diisocyanate, diphenylmethane 2,2'-diisocyanate, 2,4'-diisocyante, 2,6'-diisocyanate and 4,4'-diisocyanate, and naphthalene 1,5-diisocyanate are preferred aromatic diisocyanates.

Page 7, paragraph 2-

The film can further contain fillers, either instead of the fibers or additionally. Suitable fillers are, for example, calcium carbonate, talc, kaolin (especially kaolin/quartz mixtures, known as "Neuburg Silica"), titanium dioxide, silicates (especially wollastonite, an inosilicate), anhydrite (= calcium sulfate), particles of cellulose or native starch (especially those having a particle diameter of 15 μm or less). The median diameter of the filler particles (d_{pF}) is in the range from 0.1 to 50 μm, preferably form 0.1 to 20 μm, particularly preferably form 1 to 5 μm. Their content can be up to 30% by weight, but preferably it is from 2 to 15% by weight, particularly preferably from 4 to 10% by weight, in each case based on the total weight of the thermoplastic mixture.

In the Claims

1. (Amended) A film [which comprises thermoplastic starch and/or a thermoplastic starch derivative and which is] produced from a thermoplastic mixture which comprises: a) thermoplastic starch, [and/or] a thermoplastic starch derivative or both a thermoplastic starch and thermoplastic starch derivative, and b) at least one polyester urethane, with the weight ratio a):b) being in the range from 75:25 to 5:95, and which has an area-based drawing ratio of from 2 to 70.

4. (Twice Amended) The film as claimed in claim 1, wherein the polyester urethane comprises [consists of] hard polyurethane segments and soft polyester segments, the segments being arranged in alternating sequence.

12. (Twice Amended) The film as claimed in claim 1, wherein said film comprises an inner preparation, an outer preparation or both an inner and outer preparation [it is furnished with an inner and/or outer preparation].

14. (Twice Amended) A packaging film comprising a [The use of the] film as claimed in claim 1 [as packaging film].

15. (Twice Amended) A seamless, tubular sausage casing comprising a [The use of the] film as claimed in claim 1 [as seamless, tubular sausage casing].

substances such as lubricants, plasticizers and fillers are added to the thermoplastic starch or the thermoplastic starch derivative.

Surprisingly, it has been found that a significant improvement occurs when the thermoplastic starch or the starch derivative is mixed with thermoplastic polyester urethanes.

The thermoplastic polyester urethane (also termed "TPU" hereinafter) consists of hard polyurethane and soft polyester segments, the segments being arranged in alternating sequence. "Soft" denotes segments having a glass transition temperature (T_g) of -20°C or below, in contrast "hard" denotes those having T_g of +30°C or above. The polyester urethane can be of aliphatic or aromatic nature. The proportion of polyurethane segments in the thermoplastic polyester urethane is in this case from 10 to 90% by weight, preferably from 20 to 50% by weight, in each case based on the total weight of the polyester urethane. They generally consist of diisocyanate and diol unites. The diisocyanate unites can be aliphatic, cycloaliphatic or aromatic. Examples of aliphatic diisocyanates are butane 1,4-diisocyanate and hexane 1,6-diisocyanate. Isophorone diisocyanate (= 3-isocyanatomethyl-3,5,5-trimethylcyclohexane isocyanate) represents a cycloaliphatic diisocyanate. Toluene 2,4-diisocyante and 2,6-diisocyanate, diphenylmethane 2,2'-diisocyanate, 2,4'-diisocyante, 2,6'-diisocyanate and 4,4'-diisocyanate, and naphthalene 1,5-diisocyanate are preferred aromatic diisocyanates.

The polyester segments generally have a mean molar mass M_w of from 500 to 10,000 g/mol, preferably from 100 to 4000 g/mol. They preferably consist of units of dihydric or polyhydric alcohols and units of dibasic or polybasic carboxylic acids. They may be prepared from said starting materials by condensation polymerization in the presence of catalysts such as titanium butoxide (= orthotitanic acid tetrabutyl ester). However, usually, the polyester segments consist of diol and dicarboxylic acid units. In the condensation

The inventive film can finally further be reinforced with fibers. Generally, the fibers are relatively short (on average about 0.1 to 3 mm, preferably from 0.2 to 1.5 mm). In order that the casing remains biodegradable, particularly suitable fibers are those from cotton linters, woodpulp, from regenerated cellulose ("regenerated fibers"), from hemp, flax, sisal or jute. The proportion of fibers is up to 30% by weight, based on the total weight of TPS + TPU. Preferably, the fiber proportion if from 2 to 15% by weight, in each case based on the total weight of the mixture. The fibers are uniformly distributed in the thermoplastic mixture in the course of the blend preparation process.

The film can further contain fillers, either instead of the fibers or additionally. Suitable fillers are, for example, calcium carbonate, talc, kaolin (especially kaolin/quartz mixtures, known as "Neuburg Silica"), titanium dioxide, silicates (especially wollastonite, an inosilicate), anhydrite (= calcium sulfate), particles of cellulose or native starch (especially those having a particle diameter of 15 μm or less). The median diameter of the filler particles (d_{pF}) is in the range from 0.1 to 50 μm, preferably form 0.1 to 20 μm, particularly preferably form 1 to 5 μm. Their content can be up to 30% by weight, but preferably it is from 2 to 15% by weight, particularly preferably from 4 to 10% by weight, in each case based on the total weight of the thermoplastic mixture.

For films having a particularly high stability to hot or boiling water, it has proved to be expedient to add crosslinkers to the thermoplastic mixture. Suitable crosslinkers are, for example, dicarboxylic acids, diisocyanates or triisocyanates (particularly hexamthylene diisocyanate), dialdehydes (particularly glyoxal), diepoxides, diimines, or silanes or siloxanes containing vinyl group(s), for example vinyltrimethylsilane. The crosslinker is preferably not added until the remaining components of the mixture are already molten. The proportion of crosslinker(s) is up to 10% by weight, preferably from 0.5 to 5% by weight, particularly preferably from 1 to 3% by weight, in each case based on the total weight of the thermoplastic mixture.